

Revolution Wind

- A Joint Venture of Ørsted and Eversource

Federal Consistency Review

**Revolution
Wind**

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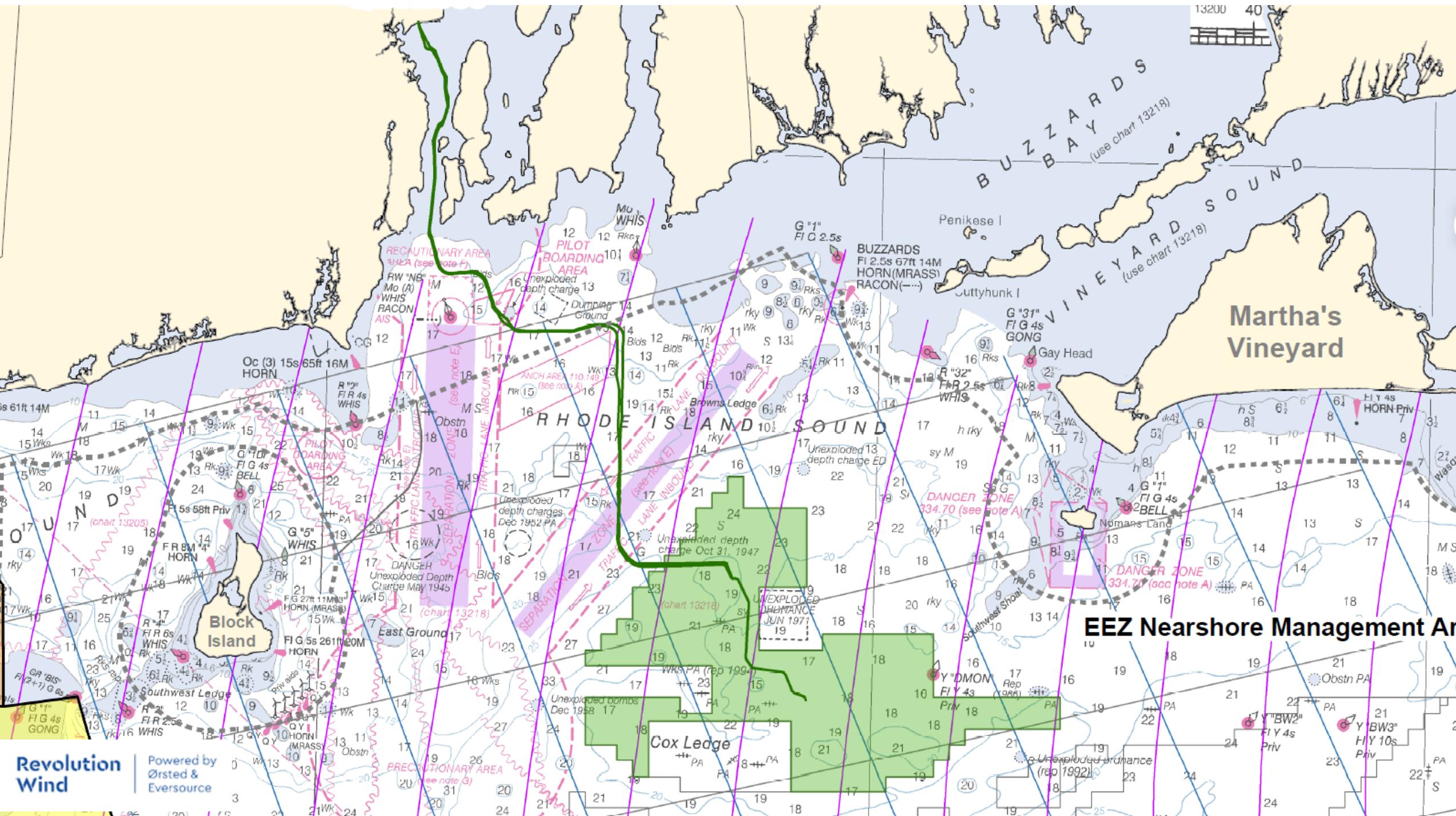
04.25.2023

Kellen Ingalls

- Ørsted, Revolution Wind, Project Development Director

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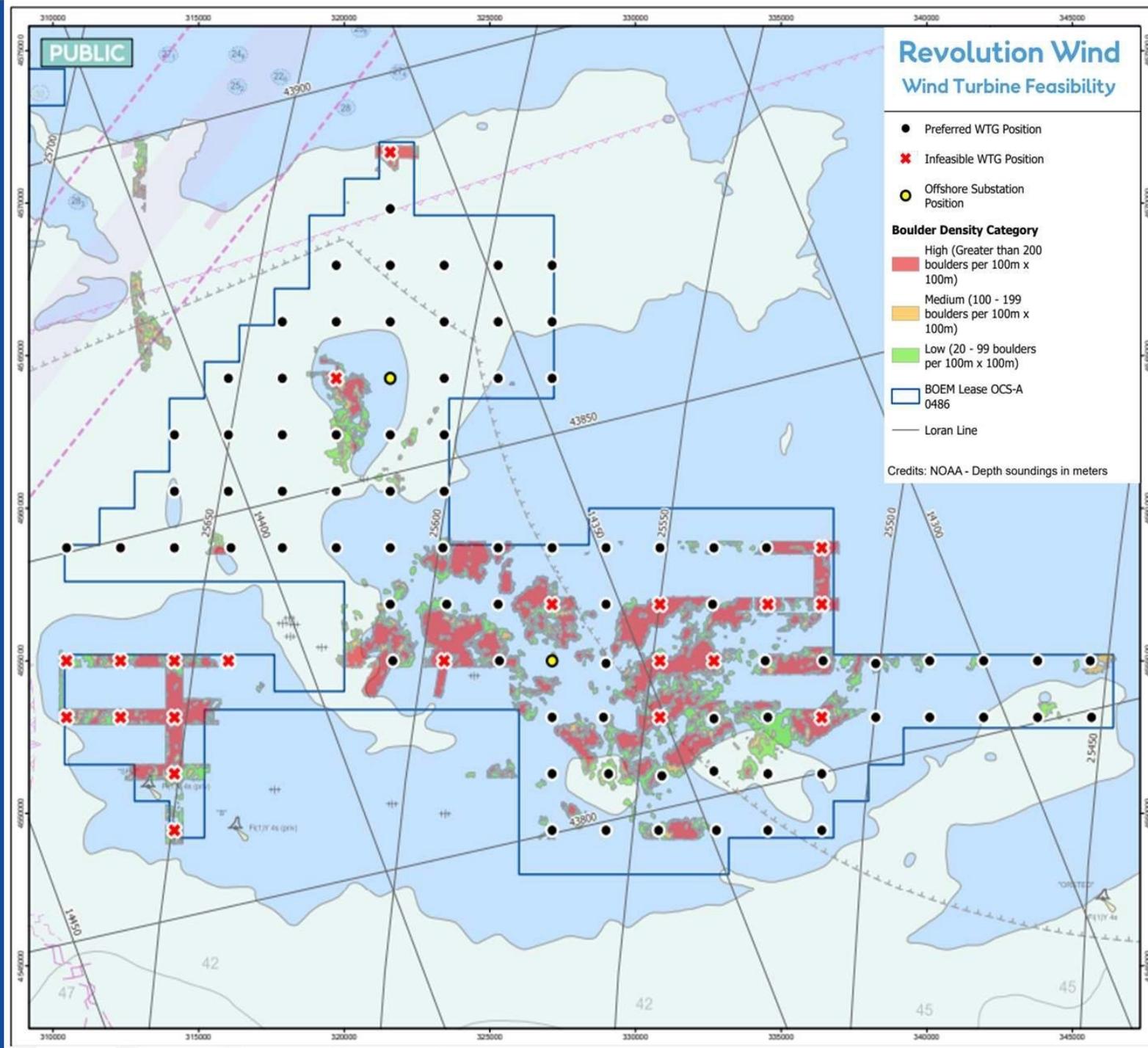


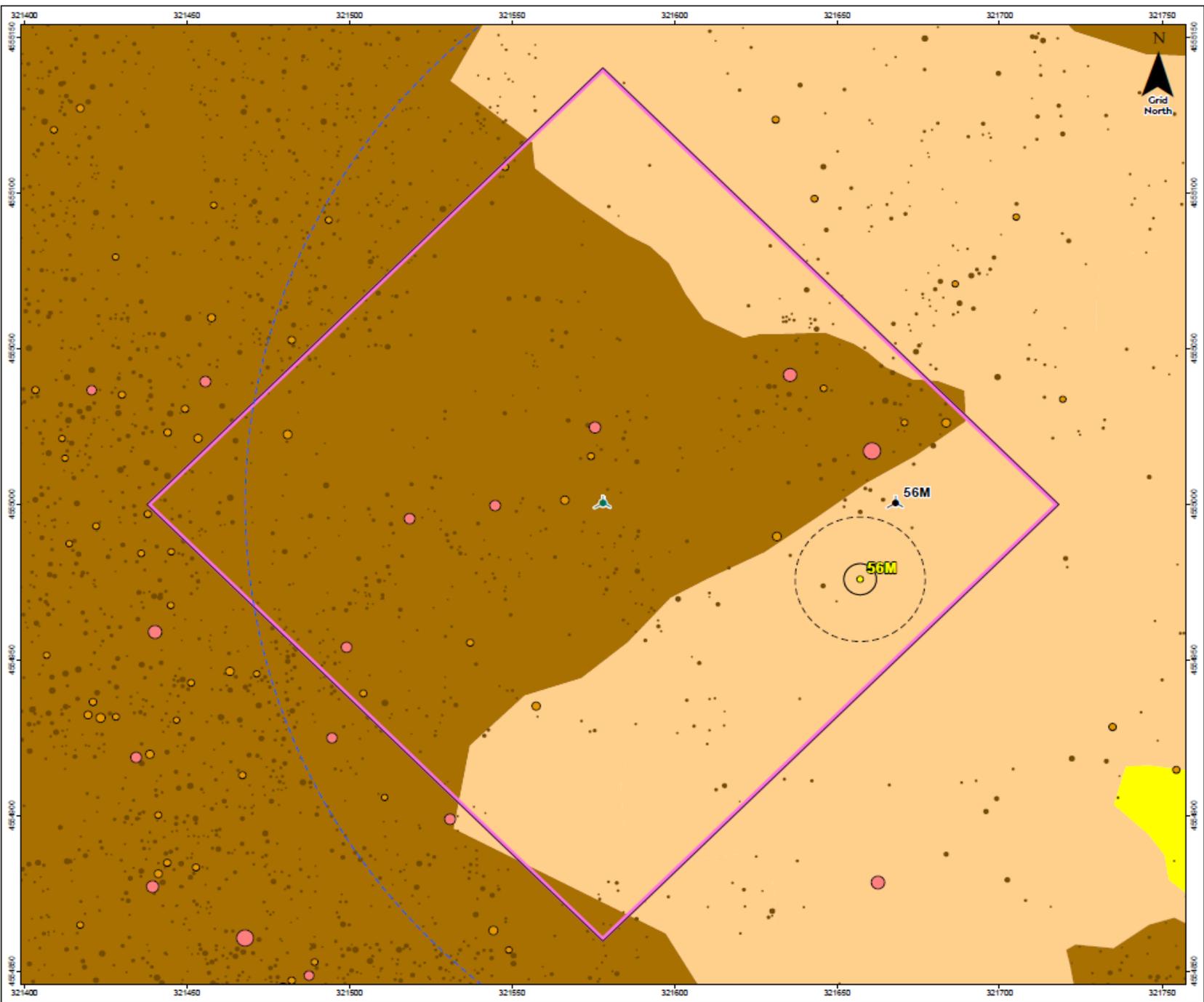
Martha's Vineyard

EEZ Nearshore Management Area

Available Turbine Locations for Revolution Wind

- 79 available positions due to technical feasibility
- Need to further consider electrical design limitations
 - Proximity to shore
 - Equal number of turbines per substation
 - Preferred to have six WTGs per string
 - Balancing of the collection and export infrastructure
- Need to consider other resources
 - Cultural resources
 - Visual impacts
 - Benthic habitat and EFH

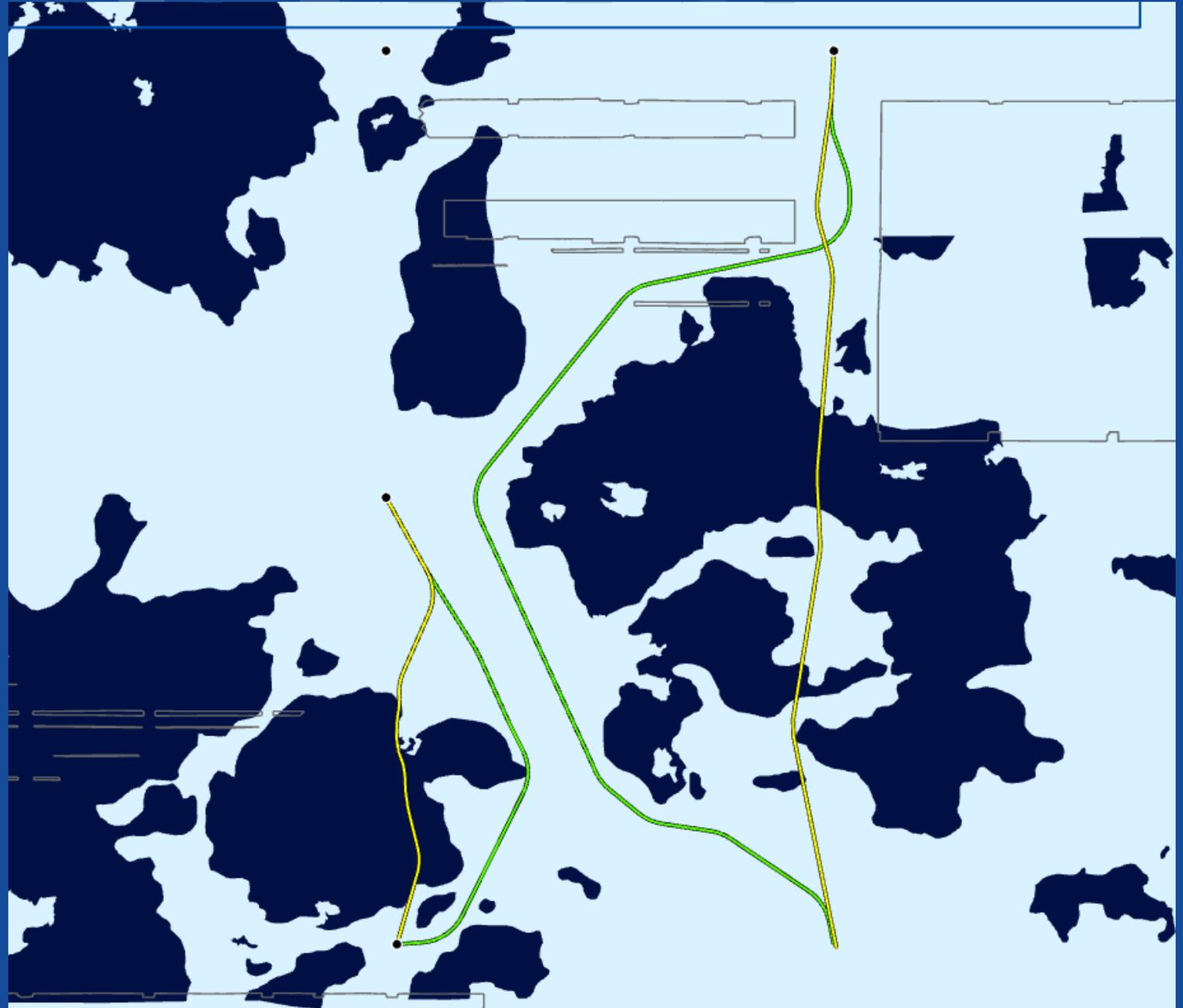




Micrositing

Example of routing array cable around glacial moraine

- **Yellow** = most direct route
- **Green** = re-routed to avoid glacial moraine



Construction Schedule

Inter-Array Cables	
Seabed Preparation (includes boulder clearance and PLGR)	Jan – May 2024
Cable Installation (includes joints and cable protection)	July – Dec 2024
Remedial Works (if necessary)	Dec 2024

WTG Foundations	
Foundations (including offshore substation monopiles, modular support frame, secondary structures, and topsides)	May – Aug 2024
Scour Protection (Remedial works if necessary)	Mar – May 2024 (Oct 2024)
WTGs	May – Oct 2024

Export Cable – Federal Waters	
Seabed Preparation (includes boulder clearance and PLGR)	July – Sept 2024
Cable Installation (includes joints and cable protection)	July – Dec 2024
Remedial Works (if necessary)	Oct, Dec 2024



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Gareth Ellis

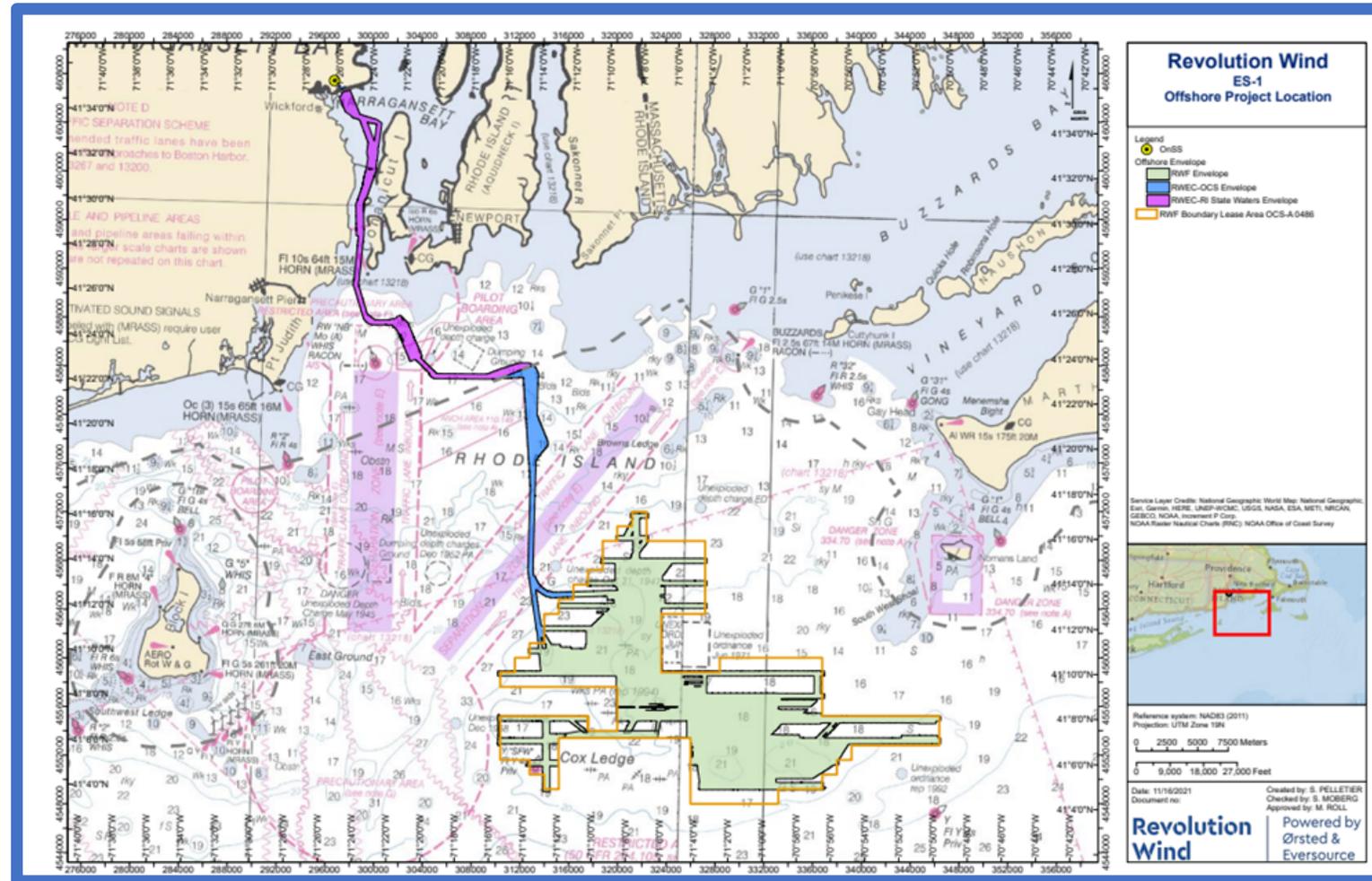
- Ørsted, Revolution Wind, Electrical Package Manager

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Revolution installation basics

1. Cable trenching basics
2. Spatial summary SEABED PREPARATION
3. Spatial summary BURIAL TECHNIQUES



Cable trenching basics



Target burial depth requirements are 4 to 6 ft for all cables

Export - simultaneous trenching with plough, secondary jet trenching

Array – jet trenching and mechanical trenching

Cable Burial Risk Assessment (CBRA)

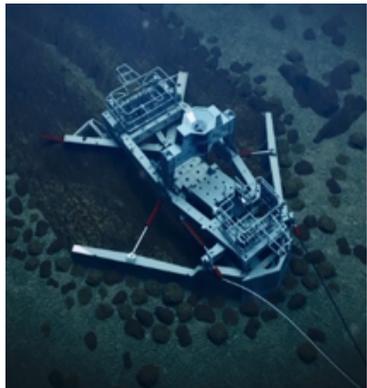
Secondary protection <10%

Spatial summary SEABED PREPARATION – Revolution OWF

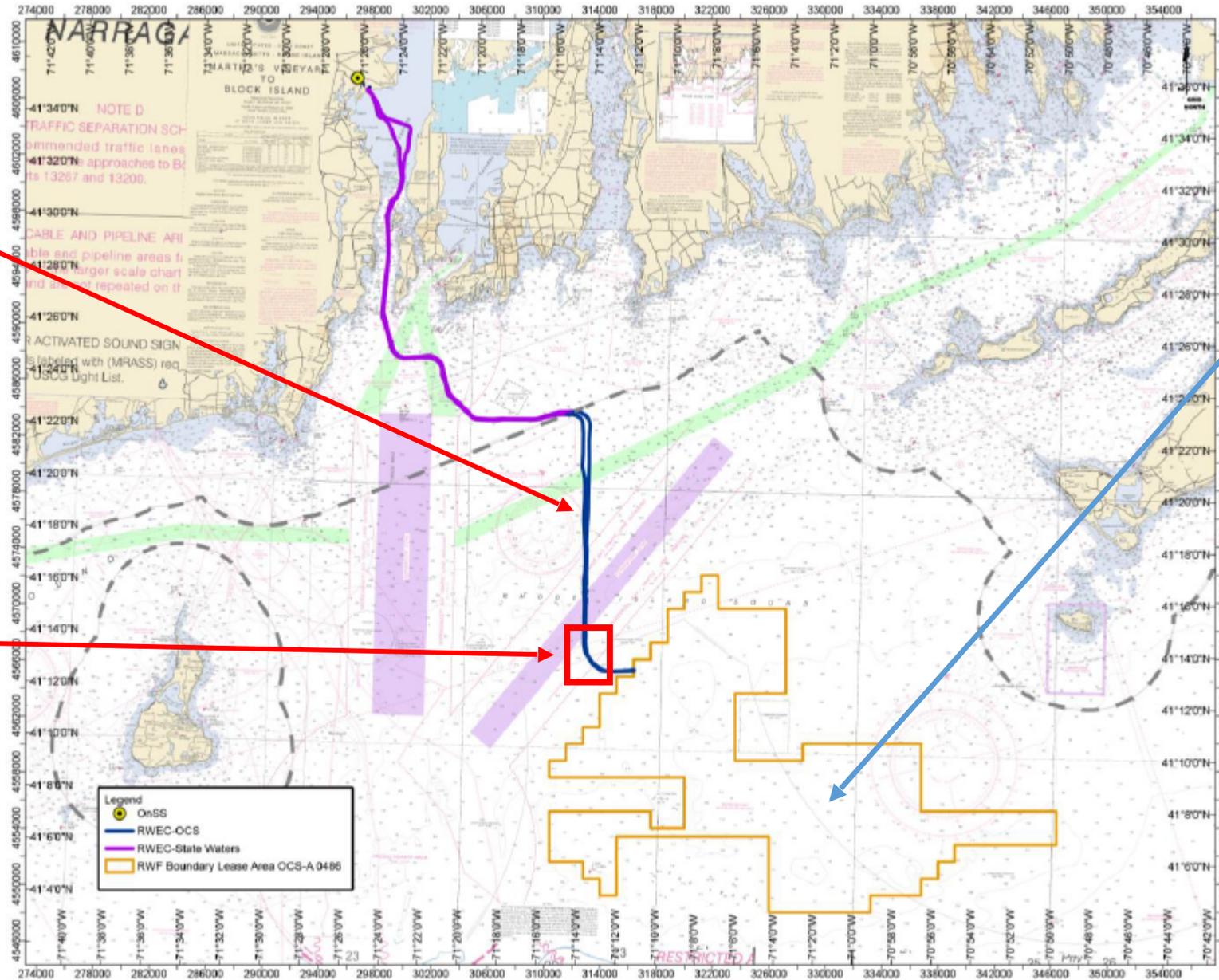
EXPORT ROUTE



Boulder Grab – along all routes and Interlink



Boulder Plough – KP45 to 56



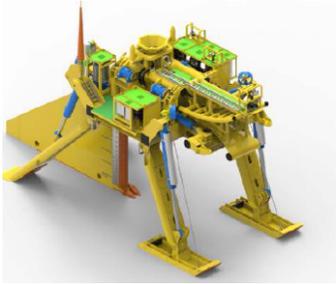
ARRAY ROUTES & FOUNDATIONS



Boulder Grab – along all routes and foundations

Spatial summary BURIAL TECHNIQUES – Revolution OWF

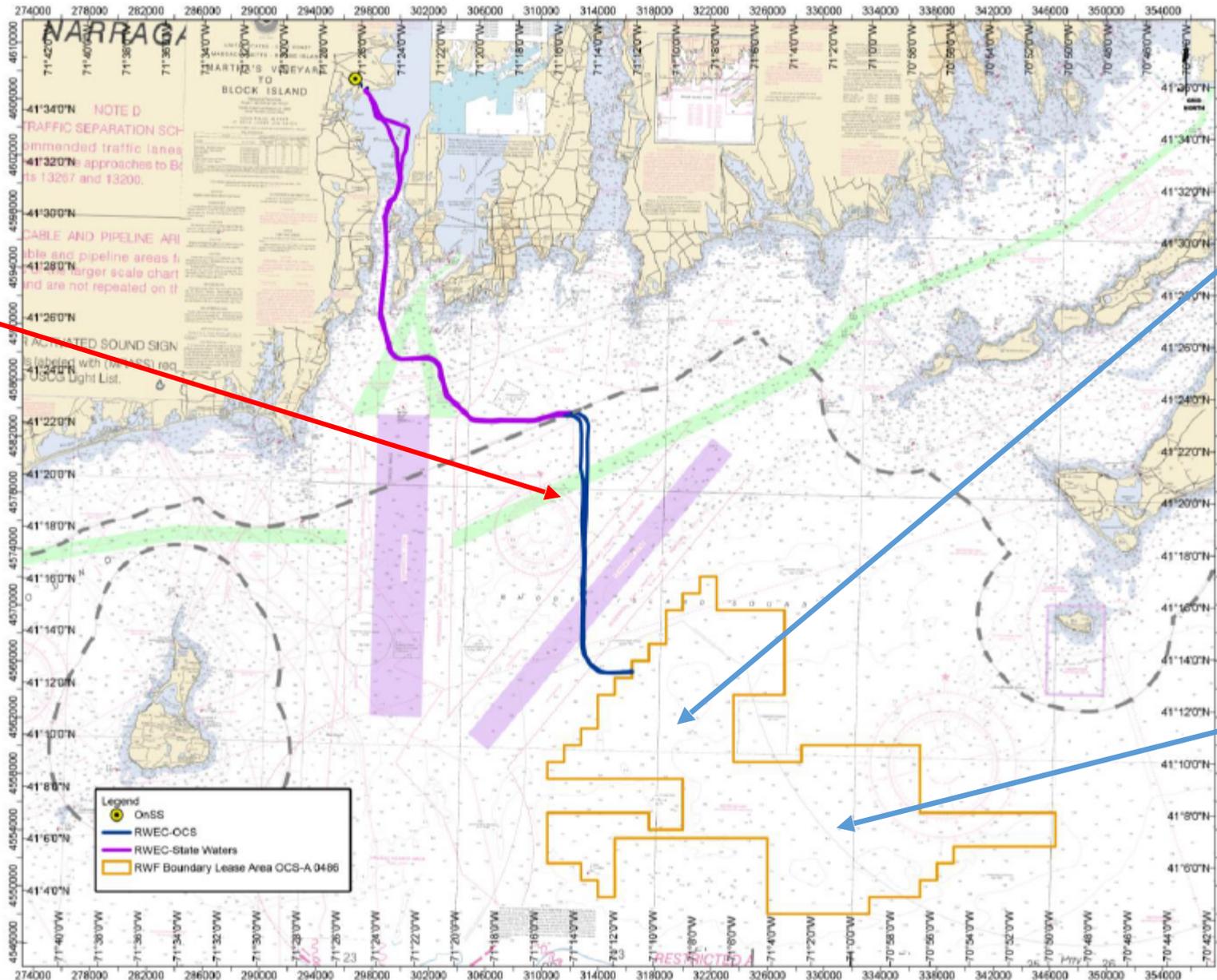
EXPORT ROUTE



Cable plough – all routes including interlink



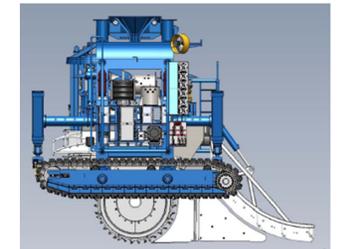
Capjet – remedial jetting and used at joint location



ARRAY ROUTES



ROVJET 1200 – used in soft soils



TMO5 – used in hard or mixed soils



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Hauke Kite-Powell, Ph.D.

- Woods Hole Oceanographic Institute (WHOI), Marine Policy Center, Research Specialist

Revolution Wind Fisheries Exposure Analysis – Rhode Island

Hauke Kite-Powell, Di Jin, and Michael Weir

Marine Policy Center, Woods Hole Oceanographic Institution

April 2023

Revolution Wind Fisheries Exposure Analysis

What is the value to Rhode Island from commercial and charter fishing around the Rev Wind lease area and the federal waters portion of the export cable route, and how will this change as a result of Rev Wind development?

Baseline value from NOAA data on landings and landed value

Baseline for-hire charter fishing revenue from 2022 charter captain survey

Indirect and induced impacts in Rhode Island estimated via multipliers

Exposure of fisheries values estimated based on likely effects on fishing during

- Construction

- Operations

- Decommissioning

Summary of baseline economics in Rhode Island

Commercial fishing:

Rhode Island landings from WTGA and ECC:	\$864,000/year
Rhode Island landings with multipliers:	\$1,833,000/year

For-hire charter fishing:

Rhode Island revenue from WTGA and ECC:	\$276,000/year
Rhode Island revenue with multipliers:	\$448,000/year

Exposure due to construction effects

Pile driving scheduled for < 9 months

Assume finfish leave when noise exceeds 160 dB: 5km buffer around WTGA

Assume shellfish mortality at 219 dB / 24 hours: 160m radius around 81 turbine towers \cong 2% of WTGA

250 km of inter-array cables @ 40 m max disturbance

\cong 3% of WTGA

Availability effects due to construction	WTGA+5km		100% of finfish leave area (a)	1 year
	WTGA		Lobster/crab landings reduced 10% (b)	1 year
			Other shellfish landings reduced 10% (c)	4 years
	ECRA	1.6km WA	All landings reduced 10% (d)	1 year
180m ECCs		Lobster/crab landings reduced 25% (e)	1 years	
		Other shellfish landings reduced 25% (f)	4 years	
Construction constrained access	WTGA		No fishing in 50% of area (g)	1 year
	ECRA	1.6km WA	No fishing in 5% of area (h)	6 months
		180m ECCs	No fishing in 100% of area (i)	2 months

Exposure during operations

Mobile gear (bottom trawl, scallop dredge) accounts for about half of landed value from WLA

100m radius around turbine towers < 1% of WTGA footprint

Effects during operations	WTGA		Landings reduced by 5% (j)	30 years
	ECRA	1.6km WA	None	
		180m ECCs	None	

Exposure may be concentrated in early years after construction

Exposure due to decommissioning

Similar to construction but less severe (no pile driving)

Availability effects due to decommissioning	WTGA		None beyond constrained access	
	ECRA	1.6km WA	All landings reduced 5% (k)	1 year
		180m ECCs	Lobster/crab landings reduced 12.5% (l) Other shellfish landings reduced 12.5% (m)	1 year 4 years
Decommissioning constrained access	WTGA		No fishing in 50% of area (n)	1 year
	ECRA	1.6km WA	No fishing in 5% of area (o)	2 months
		180m ECCs	No fishing in 100% of area (p)	2 months

Potential exposure of Rhode Island fishing to Rev Wind

Categories of Potential Exposure		RI Direct Landed Value/Revenue (2020\$)
Construction-related effects	WLA+	\$1,058,000
	ECRA	\$60,000
Effects during operations	WLA	\$458,000
	ECRA	---
Decommissioning-related effects	WLA	\$69,000
	ECRA	\$8,000
Subtotal RI commercial direct effects		\$1,652,000
RI for-hire charter fishing direct effects		\$277,000
Total Rhode Island direct effects		\$1,929,000

Categories of Potential Exposure	RI Total Impact with Multipliers (2020\$)
Subtotal RI commercial fishing	\$3,504,000
RI for-hire charter fishing	\$450,000
Total Rhode Island impacts	\$3,954,000



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Compensatory Mitigation

Revolution Wind Initial Offer (2/15/2023)

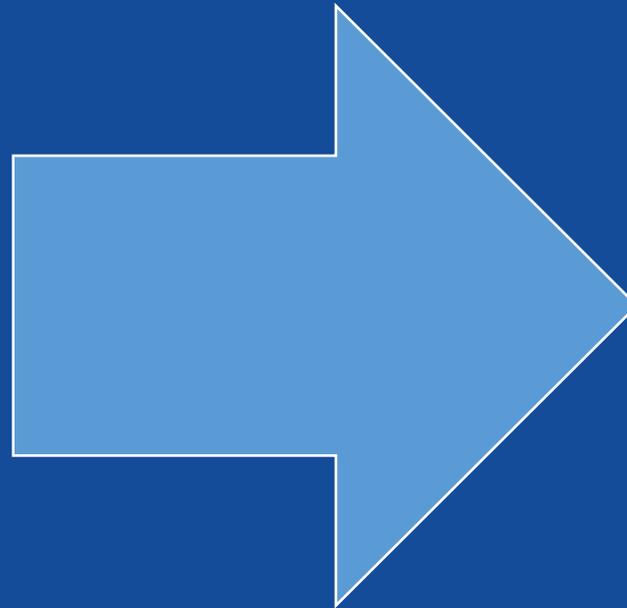
Commercial: \$6,715,000

Charter: \$500,000

Community: \$300,000

TOTAL (\$2022): \$7.52MM

- Compensation for construction delays
- Assumptions:
 - 50% loss during Year 1
 - 40% loss during Year 2
 - 30% loss during Year 3
 - 5% loss annually thereafter



Revolution Wind Final Mitigation (04/18/2023)

Commercial: \$11.5MM

Charter: \$500,000

Community: \$300,000

Effects Study: \$300,000

Navigation Fund: \$333,333

TOTAL: \$12,933,333

Assumptions: 100% losses in Year 1
80% losses in Year 2
70% losses in Year 3
60% losses in Year 4
50% losses in Year 5
5% losses in Years 6 onward

Project Effects Study

STUDY ELEMENT	EXPLANATION
Purpose	Use reliable scientific methods and data to address concerns about uncertainty of operational impacts on commercial fishing.
Cost/Funding	\$300,000 funded by Revolution Wind.
Scope	<p><u>Approach</u>: Assess the impacts to fishing activities from Revolution Wind within the wind farm area + buffer zone.</p> <p><u>Anticipated Focus</u>: (1) lobster/Jonah crab and (2) trawling.</p>
Changes considered	Effects of changes in regulations, stock status, tag limits, etc. will be considered to attempt to isolate effects caused by Revolution Wind.
Results	<p>If the study concludes that the estimated actual losses caused by Revolution Wind to commercial and for-hire/charter fisheries are greater than the anticipated potential losses, Revolution Wind will agree to an adjustment mechanism to pay the difference to the Trust, subject to a cap of \$5,000,000.</p> <p>If the study concludes that estimated actual losses are less than the anticipated potential losses, the Trust will pay the difference to Revolution Wind, subject to a cap of \$2,500,000.</p>



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